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Stranded Costs

Public Service Commission of Utah

Report to the

Electrical Deregulation and Customer Choice Task Force

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Introduction and Summary

Restructuring the electric utility industry will bring important changes to its structure, operation and regulation. Implicit in the restructuring debate is the assumption that the potential benefits arising from competition -- lower prices, product innovation, quality and service enhancements -- will outweigh such potential effects as increased transaction costs, price volatility, reliability problems and loss of scale economies. As more information comes from states further along in the restructuring process, Utah policymakers will be in a better position to decide how electric restructuring will benefit its citizens.

Stranded costs are an obstacle to restructuring. For purposes of this paper, we will use the term "stranded commitments" to emphasize that costs may be borne by customers as well as the utility, reserving "stranded costs" for discussion of impacts on the utility alone. There are vast differences of opinion about both the magnitude of stranded commitments and, in fact, whether they are positive or negative. This is particularly true for Utah, where regulated prices for electricity are relatively low. How stranded commitments are determined and how they are recovered will have a powerful effect on ratepayers and utilities. Unaddressed positive stranded commitments could damage a utility financially, perhaps impairing its ability to provide adequate service. If negative, stranded commitments could damage customers, stripping them of the benefits associated with low-cost resources, and permanently raising rates.

"Legislators and regulators and others will need to address the allocation of these costs up front and establish clear rules to determine how they will be measured and shared among different groups (e.g., utility shareholders, retail customers in different classes, wholesale suppliers and taxpayers.) Government failure to render clear policy decisions on the magnitude of and allocation of these costs will likely cause serious problems, including extensive litigation and delays in the implementation of competitive markets."[(1)] Policymakers should recognize that the magnitude of the dollars involved forces parties to pursue their own self-interests at the expense of long-run policy objectives. The issue therefore must be confronted with a determination to resolve it equitably.

The restructuring debate has produced a number of definitions of stranded costs. Some note that stranded costs should not include losses or gains associated with normal business risks, such as changes in load growth or the introduction of new technology. But in general, stranded costs can be defined as the difference between the market value and the net book value of the utility's generation-related assets.

Stranded commitments may result as the structure of the industry is changed from regulated monopoly, where prices are set by regulators to reflect prudently incurred costs, to a market structure where prices are set by the interaction of supply and demand. Utility stranded costs will

arise if market-determined retail prices for electricity do not allow the recovery of all generation-related costs. Policymakers, however, must insure that stranded commitments are a result of the decision to permit retail competition and not a result of technological change. For some utility generation assets, market value may exceed book value; for others, the reverse may be true. Stranded commitments will be, therefore, a net calculation.

Economic literature does not mention stranded costs. Some economists have likened them to "sunk" costs, meaning costs that cannot be recovered even when the firm exits the industry. Economic theory treats sunk costs as irrelevant to operations decisionmaking. Thus, the decision to recover stranded costs turns on equity concerns. In other words, it is a political decision, not an economic efficiency decision.

In a competitive industry, when market price falls to a level that will no longer allow full recovery of costs, shareholders and investors shoulder the full burden. There have been instances where government has stepped in to rescue a beleaguered firm or industry, such as the Chrysler and the saving and loan bailouts, but these cases are rare and require explicit political decisions. The argument for protecting utility shareholders during restructuring stems from the concept of a "regulatory compact" between the state and the utility. This compact, which is not a contract and is not explicit, is a general way of describing the long-standing relationship between the public and the utility. It has three core provisions: the granting of an exclusive franchise that explicitly limits entry into the market; the requirement that the franchised firm satisfy all reasonable demands for power within its territory; and rates, terms and conditions of service determined by regulators. The compact is an implied agreement which balances and rebalances (with each decision by a court or a regulatory body) a utility's rights and responsibilities.(2) These rights and responsibilities are enacted by state legislatures and enforced by state public service commissions, all within constitutional constraints. The compact adjusts in response to changing technological, economic and regulatory circumstances.(3)

Several caveats apply. If the compact is "broken" by government actions which jeopardize a utility's rights and responsibilities, placing its assets at risk, an argument can be made that the state should mitigate that risk. But if the impetus for change comes from the utility itself, then the risk-mitigation argument weakens. The primary drivers of restructuring appear to be large industrial customers and some advantaged utilities. Technological change also plays a role.(4) Therefore, policymakers must identify the costs that will be unrecovered due to technological change, as well as other factors and risks not covered by the compact. These effects must be netted out of a stranded commitment calculation. Moreover, the effect of the compact is symmetrical. For example, if ratepayers are expected to shoulder the burden of unrecovered utility costs then the utility should share financial gains if ratepayers pay higher rates under competition. In other words, it covers both the public and the utility, and interests must be balanced. This important point often is lost in the restructuring debate. It is particularly pertinent to Utah because regulated utility rates are relatively low.

Three categories of utility stranded costs have been identified. The first is generation assets (power plants). A second category consists of power-purchase contracts or fuel-supply contracts. When contracts result in costs for electricity that are higher than market prices, stranded costs may result. The third category is "regulatory assets," which includes deferred income taxes, deferred pension costs, and demand-side resource costs. A regulatory asset is created when a regulator acknowledges a cost but defers recovery for equity or rate stability reasons; it promises recovery over a future period. It does not have a market value, but if customers are allowed to choose another supplier than the utility, the cost may not be recovered.

Stranded commitments can be determined in a variety of ways.(5) All compare the regulated (book) value of a utility's assets and liabilities with competitively determined market value. The first question is how to arrive at market value. An "administrative" method uses sophisticated models to forecast the market prices of electricity, which is used to estimate a revenue stream attributed to the assets. The present value of the revenue stream is compared to the assets' net book value to calculate stranded costs. A "market" method determines the value of the assets and liabilities by placing them for sale. The level of detail used to determine the value of the assets is also an important consideration. It can be approached either "top-down" (valuing the assets as a group) or "bottom-up" (valuing assets individually). The latter requires much greater detail. Finally, a key question will be whether to value the assets prior to restructuring or after restructuring is complete.

In the fall of 1997, interested parties presented estimates of PacifiCorp's stranded costs to the Electrical Deregulation and Customer Choice Task Force. All used the administrative approach: the estimates were the products of forecasts. They varied wildly, ranging from PacifiCorp's estimate of a positive $1.5 - $3 billion to the Committee of Consumer Service's negative $2.4 billion. Because of its complete dependence on forecasts of variables like market price, the administrative method is unreliable for the purpose at hand.(6) At this point, our recommendation is a market valuation mechanism. It will require either sale of generation assets or establishment of a mechanism to "true-up" the value of the assets over their useful lives. This should not be taken to mean that we presently favor sale of generation assets as the best means of determining stranded costs, but that we may recommend determination of stranded costs on a year-by-year basis over asset lives, with recovery dependent upon a balancing account set up for the purpose. This is a decision that could only be reached after examination in an evidentiary proceeding.

We note that stranded costs must be calculated over the life of the assets. In the early years, excess capacity in the West will depress market prices while the embedded costs (net book value) of the assets are relatively high. Over time, accumulated depreciation will lower embedded costs while market prices rise to reflect the full cost of new capacity and energy. This path over time must be recognized if all parties are to be treated fairly.

Stranded Commitments

The electric industry restructuring debate has produced the term "stranded cost" or "transition cost" to denote certain potential losses a utility may experience during the transition from regulation to competition. We broaden the consideration, however, to include losses other parties, particularly ratepayers, may experience, and therefore substitute the term "stranded commitments."[7] These are the potential losses arising from utility, consumer, and government initiatives to restructure the electric industry. The term "costs" should not focus attention unduly on potential losses utilities may experience while ignoring those imposed on consumers.[8] We do not use the term "transition cost" because it may lead to a "kitchen sink" effect, where every expense, however remotely tied to the transition, may be argued as being due to the transition.[9] In our use of the term stranded commitments, "stranded" means losses that would not occur "but for" electric industry restructuring. "Commitments" emphasizes that both the consumer and the utility are at risk from restructuring efforts.

If deregulation occurs, a utility may not be able to recover some costs that are currently recovered in regulated rates. These include the net book costs of generation assets, other generation-related liabilities, and "regulatory" assets (defined below). In a restructured or competitive environment, if the market clearing price falls below the average total cost of production a utility will not recover its entire investment. But to be considered stranded, a loss of this nature must be limited to costs that are unavoidable -- costs the utility cannot mitigate by decreasing or even ceasing production. They must also exclude those due to changes in technology and those that could not, under regulation, be recovered. Some economists refer to a cost that cannot be recovered even if the underlying assets are sold as a "sunk" cost.[10]

Thus, for purposes of our report, stranded commitments arise from initiatives to restructure the electric industry. They are the potential losses that (1) subject to caveats concerning mitigation, technological change, and treatment under regulation, the utility may not be able to recover as a result of the transition from regulation to competition, and (2) consumers may incur due to such things as higher prices, increased price volatility, service or quality degradation, and increased transaction costs.

Common Features of Definitions

Our definition of stranded commitments is consistent with most definitions of stranded or transition costs. For instance, "The 'stranded costs' of a generating facility or purchased power contract at a particular point in time is equal to its sunk costs . . . minus the net operating income earned from any generation services it supplies from these facilities."[11] Various definitions of stranded costs found in the literature share common features. They include the fixed costs of generation assets that cannot be recovered in the new competitive regime; they result from government-initiated regulatory changes; they include regulatory assets; and their value depends on assumptions and forecasts. Our definition broadens this to include impacts on ratepayers. Common features of definitions include the following:

Generation Fixed Costs: Stranded commitments may include costs associated with generation that are unrecoverable in a restructured industry. Variable costs by definition are avoidable and hence not strandable.[12] Most definitions disallow costs associated with transmission and distribution.[13] Commitments that are strandable are those that "but for" restructuring would be recovered.[14]

Government-Initiated Change: Stranded commitments are commonly said to be the result of government-initiated regulatory change.[15] This view may mistake a proximate for the ultimate cause. Since large commercial and industrial customers, and some utilities -- notably, PacifiCorp in 1997 -- have pushed hard for restructuring, government (legislatures and regulators) is unlikely to be the only cause. Technological change, particularly in generation, has stimulated the debate over restructuring as well. "The idea that 'regulation' bears primary responsibility for today's predicament . . . is a convenient utility-sponsored rewriting of history."[16]

Regulatory Assets: Following the "but for" test, most definitions include costs associated with regulatory assets that may be unrecoverable in a competitive market.[17] Regulatory assets are future obligations incurred by the utility due to regulatory treatment. They include deferred income taxes, pension fund expenditures, and the costs of demand-side management programs.

Future Uncertainty: Definitions of stranded commitments usually require measuring the present value (raising the issue of the proper discount rate) of a future monetary loss or gain, and thus forecasting future events including market conditions, interest rates, regulatory trends, generation costs, and a host of other variables. It is very important to understand that the assumptions underlying different definitions and embodied in forecasts may lead to dramatically different results.[18]

A list of generation-related assets that might be considered strandable or unrecoverable during the transition to a more competitive environment has three categories:

1. Utility-owned generation assets;

2. Liabilities such as long-term power-purchase and fuel supply contracts; and

3. Regulatory Assets such as deferred taxes, pension plan costs, and the costs of demand-side management programs.

On the other side of the coin are public-policy programs which, if lost due to restructuring, can be considered stranded benefits. These include programs for tax collection, environmental compliance, demand-side management, renewable resources, low-income support, and energy research and development.

In short, certain costs arising from utility-owned generation and the costs of long-term contractual obligations should be included in an estimate of stranded commitments.[19] The *net* value of the utility's entire generation portfolio should be considered -- some assets will have a market value below book value while others will have a market value above book value. But units that are not economic and which under the rules of traditional regulation would not be considered "used and useful" should not be included in an estimate of stranded costs.[20]

Alternative Definitions of Stranded Commitments

Though many definitions may exist today, the three below are broadly inclusive. Any definition will raise real difficulties, however, because each suggests the method by which stranded commitments are calculated, and, in turn, their dollar magnitudes. We have drawn from them the points we believe important to a working definition for Utah.

1. FERC (Order 888)

In this order, FERC defines stranded "costs" as:

any legitimate, prudent and verifiable cost incurred by a public utility or a transmitting utility to provide service to: (i) a wholesale requirements customer that subsequently becomes, in whole or part, an unbundled wholesale transmission services customer of such public utility or transmitting utility, or (ii) a retail customer that subsequently becomes, in whole or part, an unbundled wholesale transmission services customer of such public utility or transmitting utility.[21]

Under FERC rules, some customers have the option, through self-generation and other means, to obtain their power from alternative sources. The risk of losing these customers may already be reflected in the allowed rate of return and current rates, so strandable costs are limited to those stranded by restructuring. These are determined by application of the "but for" test: but for changes in regulatory policy these costs would be recovered in rates.

FERC's jurisdiction is wholesale sales, most under contract. If a contract is abrogated, redress is through the courts. Thus, stranded costs should not be a major issue with the restructuring of the wholesale market. We believe the FERC definition, however, is inadequate for retail (state) concerns. For instance, FERC advocates use of a "revenue lost" approach to measure stranded costs, thereby ignoring the market value of the underlying generating assets. It also assumes that market value is less than net book value and thus presupposes the existence of positive stranded costs.[22] FERC uses an administrative method, which for reasons we explain later, is inadequate.

2. Baxter et. al. (Oakridge National Laboratory)

Baxter defines "transition costs" as "the potential revenue shortfall a utility may experience through government-initiated deregulation of electricity generation."[23] What is implied by "the potential revenue shortfall" is a market-value to book-value comparison of a utility's generation assets. "One simple measure of this revenue shortfall is the difference between a utility's embedded cost of generation and a generation price that might result from a competitive generation market."[24] This is the fixed cost of generation that would be unrecoverable under a restructured electric industry.[25] In a competitive market, this revenue shortfall would simply be the economic losses or gains[26] a firm would experience as the market price fluctuates.

According to Baxter, if the revenue earned by the utility after restructuring is less than the utility earns under regulation (which just covers the embedded costs of generation), the utility will suffer a revenue shortfall. If the utility would earn excess profits under restructuring, its revenue would be greater than its embedded costs of generation. In other words, customers would be worse off after restructuring. Thus, our definition of stranded commitments (see page 11), the loss suffered by either the utility or its customers due to restructuring, is consistent with Baxter's.

3. Maloney, et.al. (Citizens for a Sound Economy Foundation)

In a report prepared for CSEF, Maloney et.al. define stranded commitments as "the difference between the current market value of the asset in its productive employment and the historical cost of the asset depreciated through time."[27] The historical cost minus accumulated depreciation is the net book value of an asset which in turn is an asset's value for regulatory purposes. This is consistent with our definition (see below).

Concluding Observations on Definitions

The definition of stranded commitments we recommend, while consistent with the notions of stranded or transition costs, is broader. In our view, the industry discussion of stranded commitments has improperly focused on the utility's potential losses while ignoring those faced by customers. If a utility's stranded costs are negative, consumers could be worse off under restructuring than before. Therefore, the definition and measurement of stranded commitments must explicitly take this risk into consideration. Policymakers should develop policies and a recovery mechanism that protects both the utility and its customers.

The only commitments that should be considered stranded are those explicitly due to restructuring. These cannot be the result of technological change and must pass the "but-for" test. Assets that are uneconomic due to changes other than restructuring must be eliminated from consideration. The party advocating restructuring is important as well. If the utility advocates restructuring, it can be argued that it should be at risk for recovery of stranded costs. Likewise, one can make the same argument if restructuring is advocated by a group of customers.

We conclude that a useful definition of stranded commitments is the potential losses arising from utility, consumer, and government initiatives to restructure the electric industry. These losses include both (1) utility generation-related costs that are now being recovered in regulated rates, that cannot be avoided or mitigated, that are not due to technological changes, and that will not be recoverable in a competitive market, and (2) losses that consumers may incur due, for example, to increased price volatility, service or quality degradation, or increased transaction costs.

Regulatory Compact

We briefly consider a subject many believe to be the basis for stranded commitment recovery. The "regulatory compact" is a notion of rights and obligations between a utility and the public that has developed over time. Rather than a legal contract or static concept, the compact consists of rules and practices that evolve as economic, technological, and regulatory circumstances change. Though the compact is not explicit, these rights and obligations define in a general way the relationship between government (the public) and the regulated industry.

Under the regulatory compact, state governments issue exclusive franchise territories or certificates of public convenience and necessity which protect a utility from competition. So that electric service may be provided in an orderly and efficient way, state governments often extend to the utility the right of eminent domain. Based on the costs incurred to provide service, regulators will determine just and reasonable rates, terms and conditions of service with which the utility must comply. A utility's rates for service will not be unduly discriminatory. In return, the utility will have the opportunity to earn a reasonable rate of return on prudent investments that are "used and useful" in providing service to the public. The utility is obligated to invest in facilities sufficient to produce, transmit, and distribute the electricity required to meet present as well as expected demand, at an acceptable level of reliability, and to do so at lowest reasonable cost. These responsibilities have been termed the utility's "obligation to serve."

The regulatory compact is a "balancing and rebalancing of utility rights and responsibilities, enacted by state legislatures and enforced by state public service commissions, all done within constitutional constraints."[28] In short, the regulatory compact gives a utility an opportunity to recover all legitimate and reasonable costs of providing electric service, including a reasonable return on investment. In return, a utility must provide all service demanded within its franchised service territory at rates, terms and conditions established by regulatory authority. The compact is not explicit; rather it is a way of describing the relationship between government and the industry. It has developed over time and continues to evolve with each decision of a court, legislature, or regulatory body.

In a competitive environment, the utility will no longer have an exclusive right to serve within a protected service territory. This " . . . cuts to the heart of the existing regulatory compact, opening up a Pandora's Box of important issues about rights and obligations under an unbundled electric service regime."[29]

Whether loss of the obligation and right to serve is a legitimate basis for the claim that a utility is entitled to full stranded-cost recovery is a question for public policy. The regulatory compact between a utility and the public is not to be considered an unarguable basis for stranded cost recovery. Because that compact, except in broad outline, is always evolving, an examination of it in current detail may reveal reason to moderate a blanket claim for stranded cost recovery.

Estimation Methods[30]

Methods to estimate stranded commitments are either "administrative" or "market." An administrative approach employs economic and financial models to forecast the value of potential losses that consumers and utilities may incur during the transition from regulation to competition. An administrative approach requires many assumptions; most particularly, estimates or forecasts of key economic components will be necessary. In a market approach, sale of the utility's assets may be used to assess stranded commitments. If the market value of the utility's assets (whether determined through actual sale or estimated by a forecast) is greater than net book value (original cost less accumulated depreciation), the excess over net book value offsets other stranded commitments.[31] If market value is less than book value, the utility may not be able to recover its net capital investment. Though only physical generation assets will be sold, other generation-related assets, such as QF contracts[32] and regulatory assets should be netted out in order to determine the value of stranded commitments. Mitigation efforts, such as buying-down contracts, must be weighed, as must the value or revenue arising from new value-added services.

Market valuation procedures may lead to "fire-sales," in which assets are sold at prices below true market value. This would artificially inflate estimates of stranded commitments. By contrast, however, recent experience, is the opposite.[33] PG&E Corporation purchased 18 electric generating plants from New England Electric System for $1.59 billion, approximately 1.4 times book value.[34] Other sales, with notable exceptions in California, have produced similar results.

The administrative and market approaches may be implemented before (ex-ante) or after (ex-post) restructuring takes place. They can value a utility's assets using a "top-down" or a "bottom-up" approach. In a top-down approach, a utility's entire portfolio of generation assets is valued

as a single group; in a bottom-up approach each individual asset is valued separately.

"The decision to allow the recovery of [stranded commitments] is a normative, political decision. Scientific . . . analysis cannot be used to make the call."[35] So likewise with choice of method. While the strengths and weaknesses of the methods are revealed upon careful consideration, actual choice is a political decision. Our evaluation of the administrative method (whether applied ex-ante or ex-post, top-down or bottom-up) versus the market method, leads us to recommend a market-based evaluation of a utility's assets applied after (ex-post) restructuring. We briefly review the approaches.

Ex-ante Versus Ex-post

The main advantage of an ex-ante approach is that it provides a forecast of potential stranded commitments up-front. Market participants can then plan for the transition with these costs clearly in mind. This might facilitate a more orderly transition.

But forecasts, even the best of them, will be wrong, or right only by luck. They depend wholly upon the assumptions employed and the data available. In forecasting stranded commitments, there will be little or no data available for key variables. For instance, these forecasts depend on the market-determined price of electricity, but competitive retail markets are just now emerging so little historical data is available. Ex-ante methods must "anticipate the . . . still undetermined industry and regulatory structure." The nature of these structures will influence the behavior of market participants, making it that much more difficult to accurately forecast market prices, as well as other key variables.[36] In our opinion, methods which rely on such forecasts pose large risks for ratepayers and shareholders.

Ex-post methods have the advantage of delaying valuation until after markets are mature and new institutions are in place. Some though not all of the uncertainty will be allayed. But delaying estimation of stranded commitments and determining a recovery method may place the utility at risk. It may be compelled to act before a competitive market develops.

Top-down Versus Bottom-up

Top-down methods consider the portfolio of generation assets as a whole. They require relatively little information and are readily understood.[37] Top-down approaches, however, have two major weaknesses. First, because assets are valued in a bundle, the relationship between individual assets and stranded commitment amounts is not identified. This relationship is important in allocating stranded commitments between the utility and its customers, and among customer classes. Second, top-down methods may be less accurate than bottom-up approaches.[38]

Bottom-up methods provide explicit information on the relationship between individual assets and associated stranded commitments. This should facilitate allocation of stranded commitments between market participants and among customer classes.

Administrative Methods

Administrative methods depend on economic and financial tools to value a utility's assets and commitments. Forecasts of key economic and financial variables, and modeling (simulating) assumed market and regulatory structures will be necessary. The problem is that estimates of stranded commitments are highly sensitive to the assumptions used in modeling and in making forecasts. Of these, the market price of electricity is among the most important.

Market Clearing Price: Future market prices cannot be forecasted with accuracy and confidence.[39] But without an accurate price forecast, an estimate of stranded commitments will be unreliable. In the absence of historical information about market prices, one cannot assess the reliability of a market price forecast. Though some information is now available from indices like the California/Oregon border (COB) index, it may not be reflective of competitive prices in general. An index like this one reflects but a small portion of the total wholesale market. Researchers identify market clearing price as one of the key variables in determining stranded commitment estimates. For example, in a simulation starting with a base price of 2.5¢/kWh, it has been found that a 20 percent increase (0.5¢) in the price of electricity leads to a 17 to 27 percent *decline* in the stranded commitment estimate.[40] Other research, based on experience in Virginia, finds that by increasing or decreasing the base price by 15 percent, approximately one-half cent, estimates of stranded commitments changed by -75 percent and +66 percent respectively. And, in that case, if the price were just 22 percent greater, estimated stranded commitments were zero.[41] Given the uncertainty of future electric prices and their potential volatility, forecast errors of one cent or less are likely. This renders forecasts of stranded commitments unreliable.

Price Volatility: Given their relative short history, these indices do not capture all the necessary characteristics of competitive electricity prices. Forecasting price volatility from the indices is a good example. Relative to other commodities, electricity is likely to experience considerable price volatility. According to one author, "in the competitive Scandinavian electricity market, for example, average annual prices vary by a factor of four." The author also argues, "[U.S.] Wholesale prices already show highly volatile behavior and this tendency may well increase."[42] Recent events in both California and the Midwest indicate that this is indeed true.

In California, during a three-hour period on July 9, 1998, bids for replacement reserves peaked at $5,000/MW (while at another time it peaked at $9,999, the highest bid allowed), pushing the total cost of replacement reserves over five hours to $9.125 million. By contrast, on June 25,

during the same hourly period, the total cost of placement reserves was just $3,300. In other words, the cost of replacement reserves increased by more than 2,000 percent.(43) In the Midwest, between June 24 and June 26, 1998, prices peaked around $7,000/MWh, a 2,333 to 3,333 percent increase over normal prices of $30/MWh.(44) According to one industry source, "A price of $3,500/MWh is equivalent to natural gas at $350/MCF and No. 6 fuel oil at $2,205 per barrel."(45) At $3,500/MWH it would cost $3.50 to run a 100-watt light bulb for 10 hours, whereas it would normally cost 3¢ at $30/MWh. More proof should not be needed, states David Penn, APPA Deputy Executive Director, that ". . . consumers will get pummeled if the deregulation cart is put before the competition restructuring horse."(46)

Sensitivity to Other Assumptions

Several other variables are key in determining stranded commitments. These include the starting date for retail wheeling, the portion of the utility's load eligible for retail wheeling, the amount charged for capacity-related ancillary services, the magnitude of fixed production costs, and the length of the period over which stranded commitments can be recovered.(47) The effect these factors have on stranded commitments is summarized in the following table.(48)

Administrative approaches are data- and labor-intensive. In some applications, they require a unit-by-unit calculation of power plant performance, plus extensive computer modeling of the utility in question and all other utilities and independent power producers in a given market. Assumptions on entry and exit conditions, customer demographic and load characteristics, costs and performance of new and existing generating units, and fuel prices will be required.(49) The likelihood of disagreement and litigation is increased.

Market Methods

As an alternative to the administrative approach, market mechanisms can be employed to estimate stranded commitments. In contrast to administrative approaches which rely on analytical tools to simulate competitive markets, market methods rely on the market itself to value assets. A market method avoids the uncertainties of forecasts and the necessity of debating assumptions. A price obtained from a sale or an auction measures the market value of a specific asset rather than an administrative method's average value. When an asset is sold, the proceeds can mitigate remaining stranded costs, shortening the transition to competition. Sale of assets may also mitigate market power concerns, if sales result in less concentrated ownership.(50)

But care must be taken to use the market method properly. Poorly designed auctions, for instance, could result in "fire-sales" in which assets are sold at a fraction of true market value. Auctions can be designed in ways that influence outcomes.(51) Recent results from around the country indicate that generation assets can be sold for more than book value. Of seven sales reported by Independent Energy, average sales price was 146 percent greater than recorded book value.

Approaches using the market in ways not involving direct sale are available. Utility generation assets could be placed in a new company or a separate division following issuance of stock which could be used to place a value on the assets. This approach is not without complications, but these are beyond the scope of this report. Another alternative would have the utility sell the output of the generation assets on the competitive market. Annual comparison of costs and revenues could be used to determine stranded costs on a yearly basis, with recovery through a balancing account.

We believe market methods can be used more effectively than administrative methods, to determine the appropriate level of stranded commitments.

Recovery Mechanisms

State regulators have a statutory obligation to set rates that are "just and reasonable." This means that rates may not confiscate shareholder property and may not exploit consumers. Regulation achieves this by setting rates to reflect the costs prudently incurred by the utility to provide electric service. In the future, rates for some electricity services may be set by market forces. As long as markets are *effectively* competitive, market prices may be fair and reasonable.(52) It should be recognized, however, that recovery of stranded commitments will artificially hold prices above competitive levels. If these prices are to promote such goals of restructuring as economic efficiency and equity, careful attention must be paid to the design and implementation of a recovery mechanism.(53) The benefits from the transition to competition for the consumer come from the promise of a more efficient industry, and this only comes after restructuring is complete and stranded commitments are recovered.

Recovery mechanisms should pursue the following goals and principles:

Ensure the Financial Viability of the Utility: Utah regulators are obligated to set rates designed to ensure the financial integrity of utilities. This includes giving the utility an opportunity to earn a reasonable return on investment. Of course, during a transition to competition, market

prices may fall short of this regulatory objective.

Ensure Ratepayers Benefit From Restructuring: In any restructuring effort, ratepayers' interests must be safeguarded. Moreover, all ratepayers should benefit from restructuring. This means, among other things, that the recovery mechanism should not permit cost-shifting among ratepayer classes.

Ensure Mitigation of Stranded Commitments: A recovery mechanism should provide incentives to mitigate or minimize stranded commitments.

Promote Economic Efficiency: A recovery mechanism should balance the goals of economic efficiency and equity with stranded-commitment recovery. The mechanism should not be a barrier to the entry of potential competitors, and it should not yield a competitive advantage to incumbent utilities.

Promote Administrative Simplicity: When two or more models achieve the same stranded commitment estimate, the least complex should be used if this can be done without sacrificing other goals or principles.

To achieve these goals and principles in a balanced way, all recovery mechanisms should satisfy three criteria. First, the recovery mechanism should place the utility at risk for all costs that can be avoided.(54) Second, the recovery mechanism should require all electricity customers to pay their fair share of stranded commitments.(55) Third, the recovery mechanism should be competitively neutral.

Stranded commitment recovery mechanisms employ either implicit or explicit charges. An explicit charge might include access and exit fees. If implicit, the charge would not appear as a line item on a customer's bill but would be part of a bundled rate. But overall, it is difficult to assess the effectiveness of implicit recovery charges.

The Experience of Other Regulatory Bodies(56)

Financial Viability of the Utility: Regulatory agencies and legislatures have stated that stranded cost recovery should contribute to the viability of the utility during the transition period. Nevertheless, allowing for recovery is a political decision and is not a requirement for (and will have no lasting effect on) economic efficiency.(57) Indeed, financial viability does not depend on full recovery. In California and Rhode Island, two very high cost states, utilities are only afforded a reasonable opportunity to recover stranded costs.(58) The Rhode Island Legislature has ordered all customers to pay an explicit fee to recover stranded costs during an initial three-year transition period. The state has also ordered a lower rate of return on some stranded assets, so that " . . . shareholders are absorbing at least some level of stranded costs."(59) In California, the recovery mechanism combines a rate freeze, rate-of-return incentives, and performance-based ratemaking with an opportunity to recover certain stranded assets costs. In Maine, recovery is allowed only to the extent regulatory assets and generation-related assets qualify as stranded costs. For example, the difference between future contract payments and the market value of purchased power contracts is assessed to determine what might legitimately be considered stranded.

Ratepayer Benefits: To safeguard the interests of ratepayers, a determination that rates are just and reasonable would be required prior to the implementation of a specific recovery mechanism. New Hampshire, for example, requires determination of stranded costs in an evidentiary proceeding, subject to public interest findings. The burden of proof rests with the utility making the stranded cost claim. These costs must not be permitted to shift unfairly among customer classes. In California, this goal is met by an explicit non-by-passable charge applied to all ratepayers that is separately determined for each customer class. In that way, cost-shifting among classes is prevented.

Mitigation: Those regulatory agencies, except the Federal Energy Regulatory Commission (FERC), that have recovery mechanisms, have designed them to provide incentives to reduce stranded costs during the recovery period. RDI notes three ways to mitigate stranded costs: (1) provide for partial rather than full recovery, (2) decouple actual costs from the stranded cost calculation, and (3) provide for sharing of cost savings.(60) These mechanisms primarily apply to ongoing, explicit-charge recovery mechanisms because sale of assets would eliminate the need for cost-minimizing incentives. Massachussets, for example, sets a date ending the period during which a non-by passable transition charge may be collected. Pennsylvania does not permit recovery of 100 percent of stranded costs, and also evaluates the utility's efforts to mitigate them. Rhode Island reduces the return on investment on stranded costs so shareholders bear some of the recovery burden.

California decouples actual costs from the stranded-cost mechanism. This is an incentive for the utility to reduce costs during the transition period. California divides stranded fossil-fuel plant costs into sunk costs and going-forward costs. Sunk costs can be recovered through the explicit transition charge, but the utility is responsible for recovering its going-forward costs through the market sale of energy. If going-forward costs are higher than market revenues, the utility must absorb the difference. If revenues are higher, they offset transition costs. A transition-cost balancing account is established and reviewed in annual transition-cost proceedings. This approach works in tandem with the rate freeze in California.

In this approach, those generation-related assets having net book value greater than market value must be balanced against those for which book value is less than market value. This is intended to give the utility an incentive to minimize its going-forward costs, to maximize its revenue from new sales, and thereby to help establish competition in electricity markets. It also reduces any competitive advantage recovery of stranded costs may provide to incumbent utilities. (For example, if a utility's stranded costs increase as market prices decrease, the utility may bid low in making sales in order to limit market entry, knowing the balance of its costs will be recovered through the explicit charge.) The

difficulty with this mechanism is that it requires some measure of market-clearing price. California developed the Power Exchange to provide a transparent market clearing price. Something similar might be necessary for Utah when the relevant market for power in Utah does not include California.

Partial recovery of stranded costs is an incentive to the utility to use this recovery for the purpose intended, which is to enable it to compete. "What utilities do with the money is as important as whether they should recover any at all . . . . The efficiency and fairness of recovery [may] depend on what happens to the proceeds."(61)

Economic Efficiency: In theory, economic efficiency is achieved when prices in competitive markets tend toward the marginal cost of production. Scarce productive resources will be used efficiently and costs of production will be minimized. Economic efficiency and stranded cost recovery are not necessarily incompatible if we ". . . properly distinguish between sunk costs and avoidable costs in both the stranded cost payments made to generators and the bills paid by customers."(62) Implicit recovery mechanisms usually fail to make this distinction. Even with explicit charges, however, care must be taken to minimize the distorting effects imposed on the market.

Administrative Simplicity: An explicit charge recovery mechanism may be more complex than ones based on implicit charges, but is more likely to satisfy the goals outlined above. Rate freezes are administratively simple but do not meet other goals unless designed to do so. In California and Rhode Island, policymakers have opted for more complexity. This apparently avoided drawn-out debates over stranded cost issues, but held the door open for mature markets to develop before ending the stranded cost discussion.

Conclusions

1. Stranded commitments are the potential losses arising from utility, consumer, and government initiatives to restructure the electric industry. They are the potential losses that (1) subject to caveats concerning mitigation, technological change, and treatment under regulation, the utility may not be able to recover because of the transition from regulation to competition, and (2) consumers may incur due to such things as higher prices, increased price volatility, service or quality degradation, and increased transaction costs.

2. The restructuring debate implicitly assumes that the potential benefits of competition -- lower prices, product innovation, quality and service enhancements -- will outweigh adverse effects like increased transaction costs, price volatility, reliability problems, and loss of scope economies. Whether this is true is an unanswered empirical question. Policymakers should recognize that the magnitude of the dollars involved forces parties to pursue their own self-interests at the expense of long-run policy objectives.

3. Whether the loss of the obligation and right to serve is a legitimate basis for the claim that a utility may be entitled to full stranded cost recovery is a question for public policy. The regulatory relationship between a utility and the public -- the regulatory compact -- is not to be considered an unarguable basis for stranded cost recovery.

4. Assets that are uneconomic due to changes other than restructuring must be eliminated from stranded-commitment consideration.

5. Evaluation of the administrative method (whether applied ex-ante or ex-post, top-down or bottom-up) versus the market method, suggests that a market-based evaluation of a utility's assets applied after (ex-post) restructuring is in the best interest of Utah's electric utilities and citizens.

6. Recovery of stranded commitments will artificially hold prices above competitive levels. If these prices are to promote such goals of restructuring as economic efficiency and equity, the recovery mechanism must be designed and implemented carefully. Consumer benefits from the transition to competition come from the promise of a more efficient industry, but only after restructuring is complete and stranded commitments are recovered.

7. Allowing recovery is a political decision. It is not a requirement for (and will have no lasting effect on) economic efficiency.

8. To safeguard the interests of ratepayers, a determination that rates are just and reasonable would be required prior to the implementation of a specific recovery mechanism, whether charges would be implicit, as in a rate freeze, or explicit. All customer classes must share equitably in recovery. An explicit non-by-passable charge applied by rate class to all ratepayers would prevent cost-shifting among classes.

9. Incentives must be in place to encourage the utility to mitigate stranded costs. Only partial recovery should be allowed (one such incentive). Financial viability of the utility may not depend on full recovery.

10. Any recovery mechanism should be designed to avoid adverse economic efficiency effects.

11. The legislature should opt for administrative simplicity unless this sacrifices other goals.

12. The Commission should be authorized to allow stranded cost recovery, subject to the determination in a rate case that any charge is equitable, non-by passable (to prevent cost-shifting among ratepayer classes), in the public interest, and consistent with all other goals. The burden of proof for full stranded cost recovery should be borne by the party making the claim.

Appendix A: Production Costs, Sunk Costs, Competition, And Firm Behavior

Some industry analysts have equated stranded commitments (or costs) with sunk costs. For convenience, we provide the following discussion of production and sunk costs.

Accounting Costs, Economic Costs, and Sunk Costs

Firms - or more technically, those who manage them - act to maximize economic profits[63] by choosing a level of output subject to a set of constraints. In general, the greatest constraint the firm faces is its production costs, which are the sum of the opportunity cost associated with each input in the production process.[64] These costs are commonly referred to as the economic costs of production and can be grouped into two categories: those costs that vary with the level of production and those costs that do not vary with the level of production, known simply as variable and fixed costs respectively.

By definition, variable costs increase as production increases,[65] decrease as production decreases, and are zero when production is zero - that is, they are completely avoidable with the cessation of production. Examples would include costs associated with raw materials, fuel, and labor. On the other hand, fixed costs do not vary with the level of output and thus in general cannot be avoided, regardless of the level of output.[66] However, it should be emphasized, as Baumol et. al. point out, "that here fixed costs mean costs that are fixed in the long run as well as in the short run. . . . investments in large-scale plant and equipment do not generally qualify,"[67] because such costs do indeed vary, albeit not with the level of production, but with changing economic circumstances over time. These types of costs are more correctly identified as *sunk costs*, costs that, once made, cannot be recovered.[68] The important point to keep in mind is, sunk costs are not economic costs - the presence (or absence) of sunk costs do not affect the output decision of the firm.[69] Another way of putting it is, accounting or book costs may over or understate the economic costs of production. A simple example will suffice to illustrate these points.

Suppose a young entrepreneur has opened an ice-cream parlor.[70] To keep things simple, we will assume that there only two expenditures which our entrepreneur faces: an hourly labor expense for one employee which, on a monthly basis, is $1,500, and a lease payment on an ice-cream machine of $1,000 per month. In addition, we will assume that the entrepreneur draws a salary of $2,500 per month. What then is the economic cost of producing ice-cream for one month? According to the actual accounting costs, the monthly expenses would be $1,500 + $1,000 + $2,500 = $5,000. But, does this reflect the economic costs of doing business? The economist would answer, " definitely not - to maximize profits, we need to determine the opportunity cost of each factor input."

The economist would agree that the $1,500 labor expense represents the opportunity cost of the employee's input. However, part of the total cost of labor is the entrepreneur's own opportunity cost of running a business - the income the entrepreneur foregoes by not working in the next best alternative. For simplicity, we will assume that the entrepreneur's best alternative is a salaried position of $2,500 per month - the entrepreneur's net opportunity cost is zero. However, the $1,000 per month lease payment may or may not truly reflect the opportunity cost of the ice-cream machine - the machine's opportunity cost is its current market value. For instance, suppose the entrepreneur could sublease the machine for $1,200 per month; the true opportunity cost of the machine would then be $1,200 and the total monthly economic cost of producing ice-cream would be $1,500 + $2,500 + $1,200 = $5,200, not the $5,000 indicated by the accounting costs. The $200 difference in total cost is exactly equal to the opportunity cost the entrepreneur faces by not subleasing the machine. Table 2 summarizes the comparison of accounting and economic costs.

The accounting costs are summarized in the second column of Table 2. The total accounting cost is simply the sum of the booked cost for each input; sunk costs are not reflected and therefore are not counted as part of the accounting costs. On the other hand, sunk costs do need to be accounted for when considering economic costs. In the first scenario sunk costs are zero - the current market value of the ice-cream machine exceeds the book by $200. This is reflected in column 3.

Suppose, however, the entrepreneur could sublease the machine for only $600 per month. What then would be the economic costs of producing ice-cream? In this case, assuming nothing else differs or changes, the total economic cost of producing ice-cream would be $4,600 - the sum of each of the inputs current opportunity cost. The $400 difference between the accounting costs and the economic costs are the *sunk costs* associated with the lease payment. (See column four of Table 2).

The sunk costs of $400 would be unrecoverable under the current market conditions. To see this, suppose the entrepreneur priced his product to reflect the booked costs of the machine - $1,000 per month. The price would then exceed the current opportunity costs of producing ice-cream and a competitor, say a new ice-cream parlor with a current lease agreement of $600 per month, could charge less and our entrepreneur would loose business. Sunk costs, therefore, should not affect the production decision of the firm. The production decision - what to produce, when to produce it, how to produce it, and how much of it to produce - depends solely on the current[71] opportunity costs associated with the various factors of production.

Apple Computer found itself in just such a position in the late 1980s. In 1988 Apple Computer stockpiled memory chips at $38 a piece. The price of computer memory subsequently fell to $23 per chip. When Apple tried to sell computers at prices reflecting their book costs of $38, "Consumers responded by purchasing stripped-down models of the Macintosh with little memory on them. They then bought add-on memory cards from other manufacturers who were using the correct, lower cost to determine their price. As a result . . . Apple's profit plummeted and they were stuck with millions of unsold chips."[72] Ironically, because Apple Computer failed to treat past expenditures appropriately, their losses were greater than need be. In other words, if they had sold computers with the memory priced at the market clearing price of $23 per

chip, their losses would have been $15 per chip rather that the entire $38.

In a case closer to home, despite substantial investment, Micron Computer curtailed its expansion into Utah when the price of memory continued to fall in the 1990s. In this case, Micron Computer correctly recognized the investment in the Utah plant as a sunk cost. If they had continued to expand and to operate the Utah plant, their losses would have been much larger.

Appendix B: Embedded Costs and Cost of Service Pricing

Stranded commitments represent the change in value of certain public utility assets after deregulation. It is instructive then to examine the value of assets under monopoly regulation versus under market competition to see why a change might occur.

Embedded Costs

Under regulation, investors build or acquire assets at lowest cost to reliably meet their obligation to serve expected demand in an exclusive franchise service territory. Regulators review the investments and, if found to be used, useful and prudent investments needed to meet growing demand at lowest cost, allow the costs to be included in the computation of total service cost. Typically, public utility plant assets include generation plant, transmission facilities and distribution facilities. Other costs that may be capitalized include pensions and deferred taxes. Investors are also allowed to earn a reasonable return on investment.

Revenue requirement equals the embedded cost of service, which includes investment (rate base) and other costs that are "going-forward" or "avoidable."

$$RR = O + d + T + [R (V - D)].$$

Where RR = Revenue Required (Total Annual Cost of Service)

O = Operating Expenses

d = Annual Depreciation Expense

T = Taxes [(73)]

R = Cost of Capital (return on equity)

V = Original Cost

D = Accumulated Depreciation

and d = (original cost - net salvage value) divided by estimated service life.

Regulated Prices

Prices customers pay under regulation are set to recover total service cost from total customer sales. Customer groups are defined based on common customer usage characteristics. Prices are structured for each customer group based on cost-causal relationships. Within each customer group, average pricing prevails. Some very large and unique customers have prices tailored to match their cost of service. In all cases, regulated prices include recovery of capitalized public utility costs over time.

Embedded Cost Exceeding Market Prices

At any point in time, regulated and market prices could diverge (assuming an unregulated market exists). This is because regulated prices reflect the "average" cost of electricity over time, and market prices reflect regional power supply and demand conditions. Market prices will vary considerably as price will be the primary instrument equating supply with demand over time. If the average of market prices over the life of a public utility asset is lower than the embedded cost of the public utility asset, then the owner incurs sunk investment costs. If it is higher, then the owner earns economic "rents" on the asset.

There are two key explanations for differences in regulatory and market asset value: (1) The point in time when value is determined and (2) the basis upon which value is determined.

The value of a regulatory asset is generally examined but once - at the time the investment is made. The basis on which value is determined is

whether the investment is used and useful for meeting expected demand in an exclusive territory, reliably, at lowest cost. Lowest cost is determined relative to the opportunities available at the time of the investment to meet customer requirements over the lifetime of the asset. If a public utility investment meets these criteria, then it is deemed of value equal to its original cost plus a return on the investment. This cost is set to be recovered annually in rates according to the following formula: d + [R(V-D)] where d = the original cost minus salvage value divided by the estimated life of the investment. Asset value is not generally revisited but can change in response to changes allowed for return and depreciation rates.

The value of a market asset, on the other hand, is dynamic. Value is determined based on current and expected market conditions. Market conditions define the opportunity cost of inputs. Since exclusive territories are eliminated (assuming deregulation), a market asset is valued based on the worth of all products and services provided by the asset in a competitive marketplace over its useful life.

To the extent that market conditions value a public utility asset [present value sum of revenue stream over life] less favorably than its value as determined in the regulatory process, [original investment cost depreciated over time], stranded costs may exist.

Appendix C. Notes on Definitions

These notes supplement the discussion of alternative definitions in the body of the report. The intent is to demonstrate the similarity of definitions.

1. Baxter (Oakridge)

To illustrate, define Q_1 and Q_2, respectively, as the demand for the incumbent utility's generation before and after restructuring.(74) That is, the total market demand for generation is Q_2 which, before restructuring, the incumbent both generates and delivers. After restructuring, due to the availability of lower priced generation, the demand for the incumbent's generation falls to Q_1 ($<Q_2$) and new entrants produce $q = Q_2 - Q_1$; total market demand is still $Q_2 = Q_1 + q$ which the incumbent delivers.(75) We can then write stranded commitments as, [IMAGE DID NOT TRANSFER TO HTML]where $TR(Q_2; Q_2)$ is the total revenue of the incumbent firm when the incumbent acts as a monopoly (i.e., produces and delivers Q_2). $TR(Q_1; Q_2)$ is the total revenue of the incumbent under competition (i.e., the incumbent produces only Q_1 but still delivers the total amount Q_2).

Under the monopoly scenario, total revenue can be written as, [IMAGE DID NOT TRANSFER TO HTML] where r_a is the average cost-of-service (COS) rate charged for the bundled services of generation and delivery.(76) Unbundling the rate into its generation and delivery components, we can write, [IMAGE DID NOT TRANSFER TO HTML] where [IMAGE DID NOT TRANSFER TO HTML] and [IMAGE DID NOT TRANSFER TO HTML] are the average COS rates for generation and delivery respectively (i.e., r_a = [IMAGE DID NOT TRANSFER TO HTML]).

Under competition or deregulation, the incumbent's total revenue can be written as, [IMAGE DID NOT TRANSFER TO HTML]where [IMAGE DID NOT TRANSFER TO HTML] is still the average COS rate for delivery, but [IMAGE DID NOT TRANSFER TO HTML] is the competitive price of generation.(77) If $q = Q_2 - Q_1$ is defined as the demand for the entrant's generation then, according to Baxter's definition, the utility's stranded commitments can be written as, [IMAGE DID NOT TRANSFER TO HTML] Or, [IMAGE DID NOT TRANSFER TO HTML] where [IMAGE DID NOT TRANSFER TO HTML] and [IMAGE DID NOT TRANSFER TO HTML].(78) That is, according to Baxter et. al., stranded commitments consists of two components: (1) a decrease in revenue due to a change (decrease) in output, and (2) a decrease in revenue due to a change in price.

2. Maloney, et.al.

Book value is simply the value of the asset as recorded in the company's books. Current market value, on the other hand, is defined as the present value of the asset's expected net cash flows.(79) The present value of the expected net cash flow over N+1 periods for (generation) asset g is defined as, [IMAGE DID NOT TRANSFER TO HTML] where R_{gj} is the expected revenue of asset g in period j, C_{gj} is the variable operating cost of asset g in period j, and i is the discount rate.

If we define BV as the current book value of all generation assets, then according to Maloney, stranded commitments can be written as,(80) [IMAGE DID NOT TRANSFER TO HTML] In an oversimplified case where all costs are recovered in the current period (i.e., j = 0), stranded commitments can be written as, [IMAGE DID NOT TRANSFER TO HTML]where R_0 and C_0 are, respectively, the total revenue and total cost of producing Q_1 - the competitive scenario - in the current period. That is, [IMAGE DID NOT TRANSFER TO HTML] where NR_0 is the utility's net revenue from generation in the current period and FC_G is fixed generation costs.(81)

Rearranging, stranded commitments can be written as, [IMAGE DID NOT TRANSFER TO HTML] where represents the economic profit of the firm. In his presentation, Maloney implicitly assumes that the net revenue or current market value of generation assets is non-negative (i.e., [IMAGE DID NOT TRANSFER TO HTML] - revenue is sufficient to cover the variable costs of generation), thus, stranded commitments depend on the relative magnitudes of the book and market values. If the BV of the utility's assets exceeds the current market value (i.e., < 0), the utility will have stranded commitments. On the other hand, if the BV is less than the current market value (i.e., > 0), the utility will gain financially from restructuring (i.e., customers may be worse off after restructuring).

If < 0 then the utility's stranded commitments are equal to its sunk costs.(82)

Appendix D. Treatment of Stranded Commitments in Other Jurisdictions

1. FERC

FERC's treatment of "stranded costs" is outlined in Order 888, which grew out of the so-called mega-NOPR wherein FERC sought input regarding open access in electric transmission and other restructuring issues including recovery of stranded costs. The mega-NOPR in turn grew out of the *Cajun* case. Cajun Electric had sought to buy power from an alternative provider but use the local utility's transmission facilities for delivery. In establishing the transmission wheeling charge, FERC allowed Entergy, the local utility, to recover stranded costs. Subsequently, "the D.C. Circuit court agreed with Cajun that FERC had not followed proper procedure in setting the tariff . . . [and] it offered *dicta* that tariffs should not tie recovery . . . to transmission charges. . . . such ties would violate antitrust law."(83)

FERC sidesteps the issue in Order 888 by taking the so-called lost revenue approach which equates stranded costs with "stranded income." Under Order 888 a (wholesale) customer who wishes to buy power from an alternative provider first negotiates a transmission tariff with their existing utility over its transmission lines. The tariff, which is subject to FERC approval, can include a charge for the revenues the utility will lose if the customer departs.

Specifically, Order 888 defines (wholesale) stranded costs as,

any legitimate, prudent and verifiable cost incurred by a public utility or a transmitting utility to provide service to: (i) a wholesale requirements customer that subsequently becomes, in whole or part, an unbundled wholesale transmission services customer of such public utility or transmitting utility, or (ii) a retail customer that subsequently becomes, in whole or part, an unbundled wholesale transmission services customer of such public utility or transmitting utility.(84)

Before a utility can recover any stranded costs, however, the utility must demonstrate that it had a "reasonable expectation" of continuing to serve a customer. If a reasonable expectation exists, the stranded costs are then calculated on a present value basis under FERC's revenue lost approach:

[IMAGE DID NOT TRANSFER TO HTML]
where:(85)

RSE = Revenue Stream Estimate - average net annual revenues that the utility would have received from the departing customer over three years prior to the customers departure;

CMVE = Competitive Market Value Estimate - An estimate of the market value of the released capacity and associated energy due to the customers departure;

L = Length of Obligation - the length of time that the utility expected to continue to serve the customer.

2. Other States

In addition to FERC, eleven other states have passed or proposed restructuring legislation or rules for restructuring. These states are Arizona, California, Illinois, Maine, Massachusetts, Montana, Nevada, New Hampshire, Oklahoma, Pennsylvania, and Rhode Island. Most have established definitions of stranded commitments and have offered some rules or procedures on how they are to be determined and recovered.

A. Arizona(86)

Definition: Stranded cost is the verifiable net difference between: a) the value of all the prudent jurisdictional assets and obligations necessary

to furnish electricity (such as generating plants, purchased power contracts, fuel contracts, and regulatory assets), acquired or entered into prior to the adoption of this ruling, under traditional regulation of affected utilities, and b) the market value of those assets and obligations directly attributable to the introduction of competition under this ruling ® 14-2-1601). The rule allows recovery of unmitigated stranded cost. It requires that affected utilities take every feasible, cost-effective measure to mitigate or offset stranded cost. (R14-2-1607)

Determination: One way to estimate stranded cost is to compare the book value of all relevant assets to the present value of expected revenues minus operating costs attributable to those assets over a long time period in a competitive market. It is possible that over time the market value of the assets will rise and the book value will fall, creating a period during which stranded cost in negative. That negative stranded cost should be balanced against any positive stranded cost in early years. (R14-2-1607)

Recovery: Incumbent utilities are to file estimates of stranded cost and proposed recovery mechanisms. The affected utilities may request Commission approval of distribution charges or other means of stranded costs recovery from customers who reduce or terminate service from the affected utility, or from customers who obtain lower power rates from the affected utility as a direct result of the phase-in program. Any reduction in electricity purchases from an affected utility resulting from self-generation, demand-side management, or other demand reduction attributable to any cause other than the retail access provisions of the proposed rule shall not be used to calculate or recover any stranded cost from a consumer. (R14-2-1607)

b. California

Definition: Categories of stranded costs for generation-related assets and obligations consist of generation facilities, generation-related regulatory assets, nuclear settlements, and power purchase contracts. They include restructurings, renegotiations or terminations costs approved by the Commission, that were being collected in Commission-approved rates on December 20, 1995, and appropriate costs incurred after December 20, 1995 for capital additions to generating facilities existing as of December 20, 1995 (provided that these additions are necessary to maintain the facilities through December 31, 2001). (367)

Determination: These uneconomic costs shall be based on a calculation mechanism that nets the negative value of all above market utility-owned generation related assets against the positive value of all below market utility-owned generation related assets. Valuation of these assets must occur by year-end 2001. (367 (b))

In the case of utility-owned fossil generation these costs shall be limited to the uneconomic portion of the net book value of the fossil capital investment existing as of January 1, 1998. (367 (c))

Recovery: These uneconomic costs shall be recovered from all customers on a non-by-passable basis and shall be amortized over a reasonable time period, including collection on an accelerated basis. Rates should not be increased above the levels in effect on June 10, 1996, provided that, for the most part the recovery shall not extend beyond December 31, 2001. Exceptions include:

- Obligation to employees to 2006;

- Costs associated with purchase power contracts to whenever they expire;

- SONGS (nuclear power plant) to 2004;

- Fixed transition costs for rate reduction will continue to be paid after December 31, 2001 by residential and small commercial customers until the bonds are repaid in full by the financing entity. (367(a))

The utilities are at risk for generation-related transition costs that are not recovered by December 31, 2001. CTC (competitive transition charge) allocation shall not result in increased rates and shall include a firewall separating small commercial and residential customers from other customers. (330(v)) CTC exemptions for large customers shall be recovered from other large customers. (330(v)(2)).

C. Illinois

Definition: not explicitly defined.

Determination: The market value to be used in the calculation of transition charges shall be determined in accordance with either a tariff providing for a determination of the market value for electric power and energy (a function of an exchange traded or other market traded index, options, or futures contract or contracts), or a tariff incorporating market values resulting from the neutral fact-finder process.

Recovery: Recovery shall be through a transition charge. An electric utility shall be entitled but not required to implement transition charges in conjunction with the offering of delivery services. Such charges shall be collected on each kWh delivered under a delivery services tariff to a retail customer from the date the customer first takes delivery services until December 31, 2006. No earlier than 16 months and no later than 12 months, prior to December 31, 2006, the electric utility may file its petition to implement transition charges for an additional period ending no later than December 31, 2008. (Sec. 16-108)

d. Maine

Definition: A utility's legitimate, verifiable and unmitigable costs made unrecoverable as a result of the restructuring of the electric industry and determined by the Commission.

Determination: For each electric utility, the Commission shall determine the sum of the following to the extent they qualify as stranded costs:

- The costs of a utility's regulatory assets related to generation;

- The difference between net plant investment associated with a utility's generation assets and the market value of the generation assets; and

- The difference between future contract payments and the market value of a utility's purchased power contracts.

Exclusions: The Commission may not include any costs for obligations incurred on or after April 1, 1995 in a utility's stranded costs, except that the commission may include:

- Regulatory assets created after April 1, 1995 and prior to March 1, 2000 for:

- Amortization of costs associated with the restructuring of a qualifying facility contract;

- Costs deferred pursuant to rate plans;

- Energy conservation costs;

- Obligations incurred by a utility after April 1, 1995 and prior to March 1, 2000 that are beyond the control of the electric utility; and

- Obligations incurred by a utility after April 1, 1995 to reduce potential stranded costs.

The Commission would establish initial estimates of stranded costs and would review them every three years after the year 2003 and adjust them if warranted. (Sec. 3208)

Recovery: The Commission shall set an amount of recoverable stranded costs after calculating the net aggregate value of all divested assets that had proceeds exceeding book costs against the aggregate value of all other stranded electricity generation assets. (Sec. 3208)

E. Massachusetts

Definition: Defines the types of costs eligible, including:

- The amount of any unrecovered fixed costs for generation-related assets and obligations which were collected in rates on January 1, 1997 and that become uneconomic.

- Nuclear entitlements by those electric companies which have divested their non-nuclear generation facilities and those previously incurred or known liabilities incurred for post-shutdown and decommissioning costs associated with nuclear power plants which are not recoverable from the decommissioning fund.

- The unrecovered amount of the reported book balances of existing generation-related regulatory assets as approved by the Department.

- The amount by which the costs of existing contractual commitments for purchased power exceeds the competitive market price for such power, upon reaffirmations, restructuring, renegotiation, or termination of such contracts, or the liquidated payments associated with the disposal of theses contracts.

In addition, certain costs incurred after January 1, 1996:

- Employee-related transition costs;

- Any payments or payments in lieu of taxes; and

- Any costs to remove and decommission retired structures at fossil fuel-fired generation facilities. (Sec.193, 1G(b))

Determination: The Department shall identify and determine upon application by a distribution company and the applicable electric company those costs and categories of costs for generation-related assets, investments, and obligations, which may be allowed to be recovered through a non-by-passable transition charge authorized to be assessed and collected. (Sec.193, 1G(a1))

Recovery: Any approved transition costs to be recovered from ratepayers through a non-by-passable transition charge. The Department shall impose a cap upon the level of the transition charge (no adjustment for inflation allowed). The Department shall require a reconciliation of projected transition costs by March 1, 2000, and for every 18 months thereafter through March 1, 2008, or the termination date of any transition charge allowed to be assessed. In no event shall the Department determine to allow any carrying costs for any period beyond the year 2009 on any unamortized balance of costs allowable as transition costs.

A distribution company's use of securitization shall be approved by the Department and shall be subject to the achievement of mitigation efforts satisfactory to the Department. An electric company which fails to commence and complete the divestiture of its non-nuclear generation assets shall not be eligible to benefit from the securitization provisions and the issuance of electric rate reduction bonds.

F. Montana

Definition: Stranded costs are called "Transition costs" and defined as a public utility's net verifiable generation-related and electricity supply costs, including costs of capital that become unrecoverable as a result of the implementation of [sections 1 through 31 SB 390] or of federal law requiring retail open access or customer choice.

Determination: Methods must include, but are not limited to: estimating future market value of electricity and ancillary services provided by the assets; appraisal by independent third party professionals; or a competitive bid sale.

Recovery: The Commission shall allow recovery of transition costs, including:

- The unmitigable above market costs of qualifying facility contracts, including buy out or buy down costs;

- The unmitigable costs of energy supply related regulatory assets and deferred charges;

- For a four- year period, the unmitigable costs of investor-owned utility owned generation and power purchase contracts;

In addition, the utility must make reasonable efforts to mitigate the costs. Upon Commission's approval the transition costs are to be recovered trough a non-by-passable charge on all customers. (Sec. 12

G. Nevada

Definition: no explicit definition.

Determination: The Commission shall determine the recoverable costs. The shareholders of the vertically integrated electric utility must be compensated fully for all such costs determined by the Commission. In determining the recoverable costs, the Commission shall take into account:

- Legal requirement to incur the costs;

- Market value above costs;

- Mitigation efforts;

- Recovery risk to shareholders;

- Utility discretion to determine whether to incur or mitigate the costs. (Sec. 46)

Recovery: The Commission may impose a procedure for the direct and unavoidable recovery from ratepayers of the portion of the past costs that are determined by the Commission to be owned by the ratepayers. The Commission has the authority to assess charges on those customers on whose behalf the costs were incurred and who are no longer receiving transmission, and distribution service, or both, from the vertically integrated utility. (Sec. 46)

G. New Hampshire

Definition: Costs, liabilities, and investments, such as uneconomic assets, that electric utilities would reasonably expect to recover if the existing regulatory structure with retail rates for the bundled provision of electric service continued, and that will not be recovered as a result of restructured industry regulation that allows retail choice of electricity suppliers, unless a specific mechanism for such cost recovery is provided.

Stranded costs may only include costs of:

- Existing commitments or obligation incurred prior to the effective date of this chapter;

- Renegotiated commitments approved by the Commission;

- New mandated commitments approved by the Commission. (374-F:2 (IV))

Determination: Stranded costs should be determined on a net basis, should be verifiable, should not include transmission and distribution assets, and should be reconciled to actual electricity market conditions from time to time. (374-F:2 (XII))

The Commission is authorized to allow utilities to collect a stranded cost recovery charge, subject to its determination in the context of a rate case proceeding that such charge is equitable, appropriate, and balanced, is in the public interest, and is substantially consistent with these interdependent principles. The burden of proof for any stranded cost recovery claim shall be borne by the utility making such claim. The Commission is authorized to set, without a formal rate case proceeding, an interim stranded cost recovery charge for each electric utility. (374-F:4(V))

Recovery: Any recovery of stranded costs should be through a non-by-passable, non-discriminatory, appropriately structured charge. Entry and exit fees are not preferred recovery mechanisms. Charges to recovery stranded costs should only apply to customers within a utility's retail service territory, except for such costs that have resulted from the provision of wholesale power to another utility. (374-F:2 (XII))

H. Oklahoma

Definition: Electric utilities have traditionally had an obligation to provide service to consumers within their established territories and have entered into contracts, long-term investments and federally mandated co-generation contracts to meet the needs of consumers. These investments and contracts have resulted in costs which may not be recoverable in a competitive restructured market and thus may be stranded.

Determination: Procedures shall be established for identifying and quantifying stranded investments and for allocating costs and mechanisms shall be proposed for recovery of an appropriate amount of prudently incurred, unmitigable, and verifiable stranded costs and investments. Each entity shall be required to propose a recovery plan, provided that the recovery period and the amount of qualified transition costs shall yield a transition charge which shall not cause the total price for electric power, including transmission and distribution services, for any consumer to exceed the cost per kilowatt-hour paid on the effective date of this act during the transition period.

No later than January 1, 1999, the Commission shall commence the study of financial issues related to restructuring (rates and charges, access and transition costs and fees, stranded costs and their recovery, stranded benefits and their recovery, and etc.)

Recovery: The transition charge shall be applied to all consumers including direct access consumers, and shall not disadvantage one class of consumer or supplier over another, nor impede competition and shall be allocated over a period of not less than three years not more than seven years.

It is the intent that all transition costs shall be recovered by virtue of the savings generated by the increased efficiency in markets brought about by restructuring of the electric utility industry. All classes of consumers shall share in the transition costs.

I. Pennsylvania

Definition: Costs related to supplying electricity that utilities could recover under the monopoly system of regulation, but that the utility may not be able to recover in a free market. (Sec. 2804)

Determination: The bill delegates ample discretion to the Commission regarding calculating stranded costs and determining the extent to which the utility may recover these costs from ratepayers. The legislation precludes cost-shifting (rate balancing) between different types of customers. (Sec. 2808 (a))

Recovery: Utilities are not guaranteed recovery of one hundred percent of their stranded costs. For the largest component of stranded costs, costs related to utility-owned generating plants, the Commission would determine the amount that it is just and reasonable for the utility to recover. The Commission would also evaluate the utility's efforts to mitigate stranded costs. For stranded costs related to contract with non-utility's generators, which utilities were required to enter into under federal law, the bill provides that such costs are recoverable. Utilities can seek Commission's approval to securitize (refinance) stranded costs provided the Commission determines that such costs may be recovered from customers.

J. Rhode Island

Definition: Defines the types of costs eligible. Termination fee for all-requirements to be recovered by non-by-passable charge paid by all customers of distribution company. Fee to include following costs of wholesale supplier:

- Regulatory assets, including those of affiliated fuel suppliers, and obligations for post-retirement health care costs;

- Nuclear obligations, including decommissioning and costs independent of operation;

- Above-market payments for purchased power plus buyout or buydown payments;

- Net unrecovered costs of generating plants, including natural gas conversion costs and above-market pipeline demand charges.

Determination: For the period July 1, 1997 to December 31, 2000 the non-by-passable transition charge shall recover an amount equal to two and eight-tenths of a cent (2.8%) per kilowatt-hour transmitted or distributed. After the year 2000, the transition charge recoverable from customers shall be established by the Commission with adjustment for over- or under- recoveries in first period.

Recovery: Recovery spread over period July 1, 1997 through December 31, 2009. Transition charge to continue until liabilities satisfied. Equity return on unamortized balance of regulatory assets and net unrecovered costs of generating plants to be at one percentage point above BBB long term utility bond.

Criticism of FERC's and California's Approaches

Both FERC's and California's treatment of stranded commitments have come under severe criticism.(87) For instance, Maloney et. al. argue that for a number of reasons the FERC's "lost-revenue approach is a sham when applied to stranded costs." First, "Order 888 . . . views revenue as a property right." In using current revenues, they claim that FERC's approach "automatically assumes" that the firm has stranded commitments when in reality the market value of a utility's assets may exceed their book value.

Second, "FERC's formula violates the entire purpose of open access." The whole idea of deregulation derives from the notion that regulation has been less than perfect. However, by using current revenues as a benchmark FERC is assuming that regulation is perfect. That is, the current regulated price is the lowest price from which the utility can recover its investment. Furthermore, the FERC must be assuming that, not only were the investments prudent at the time that they were made, but that they will continue indefinitely to be used and useful.(88)

On a similar note, John McArthur argues, "the first two serious forays into deregulation," namely FERC and California, "have brought rules for their stranded investment mistakes, even though these mistakes are what produced the need for deregulation in the first place."(89) As McArthur points out, full recovery of stranded commitments is a "regulatory oddity." In deregulating natural gas, the FERC established an "equitable sharing" rule wherein those responsible for high gas prices paid their share of the stranded commitments(90). Under the FERC and California rules, however, "Wholesale and retail customers who had little or no input in utility supply choices are to pay up to 100 percent of stranded costs."(91)

FERC and California give three reasons for allowing for full-recovery(92): the regulatory compact, the financial integrity of the utility, and cost causation. According to McArthur, none of these arguments stands up to scrutiny. First, regulatory compact arguments exaggerate the protection afforded by regulation. While regulation may have removed a number of market risks, utilities were always at risk of regulatory change. Indeed, as McArthur points out, 'The history of regulation shows repeated uncompensated changes in the regulatory fabric. . . . the risk was slight as long as utilities stayed roughly as efficient as competitive firms."(93) However, utilities never escaped the risk that a major gap in their performance would compel a regulatory change.(94)

Secondly, stranded commitments do not jeopardize the industry's financial integrity. Indeed, "in the natural gas industry FERC found that the limited recovery of equitable sharing accommodates financial integrity."(95) Furthermore, full-recovery may adversely affect the transition by undermining the utility's incentive to mitigate its own costs, stranded or otherwise, over the transition period.

Finally, cost causation should not decide customer versus utility responsibility. The FERC has never established why customers "caused" these costs in the first place. Or why customers should pay in toto a utility's stranded commitments. Utility commissions, generally speaking, use the principle of cost causation to allocate costs between customers, not to determine whose responsible for the investment having been made.

Furthermore, McArthur argues, "a high level of recovery will allow incumbents to fend off entrants . . . at just the time when we want to increase the number of firms and create more competition."(96) In other words, allowing utilities to recovery unsubstantiated or non-existent stranded commitments creates an entry barrier which will hinder the development of competitive markets. McArthur concludes, " FERC had the right idea in natural gas: tie recovery to investment responsibility." Under this idea, utilities are entitled to recovery only after they can demonstrate that "it incurred costs by virtue of regulatory compulsion."(97)

1. Eric Hirst, "Policy Choices for Electric-Utility Stranded Costs", July 1998, a report prepared for Electricity Consumers Resource Council. p. 2.

2. The legitimacy of this implied agreement or regulatory compact is questioned by certain parties.

3. Stella e. Rubia and Robert E. Burns. "Unbundling the concept of Obligation to Serve in a Competitive electric Market: Sharing the Responsibility for Reliability." NRRI *Quarterly Bulletin*, Vol.19, No. 2.

4. Charles Stalon, "The Historical Context of U.S. Electric Industry Restructuring," Parts I and II, NRRI *Quarterly Bulletin*, Vol. 17, Nos. 1 and 2.

5. Hirst, op. cit. See Section 5, "Market Valuation Estimation Methods," pp. 6-9.

6. In a recent meeting, a PacifiCorp official informed Utah regulators that forecasts of market price are neither reliable nor useful.

7. The Oakridge group may have been first to use the term "stranded commitments," though they now favor the term "transition costs." Eric Hirst, Stan Hadley, and Lester Baxter, "Methods to Estimate Stranded Commitments for a Restructuring U.S. Electricity Industry," ORNL/CON-424, Oak Ridge National Laboratory, January 1996. Lester Baxter, Eric Hirst, and Stan Hadley, "Transition-Cost Issues For A Restructuring U.S. Electricity Industry," ORNL/CON-440, Oak Ridge National Laboratory, March 1997.

8. Implicit in the restructuring debate is the assumption that the potential benefits arising from competition -- lower prices, product innovation, quality and service enhancements -- will outweigh downside effects like increased transaction costs, price volatility, reliability problems, and loss of scope economies. Whether this is true is an unanswered empirical question.

9. Despite reports that utilities will gain from restructuring, no utility has argued to reimburse ratepayers. For example, a recent Wall Street Journal special report on restructuring defines stranded costs as "Utility companies' investments in power plants and power contracts that might be unrecoverable under deregulation." Of the fourteen articles in the special report, none directly assesses the risk to consumers. (Wall Street Journal, "Shock Therapy," September 14, 1998, p. R4.)

10. For discussion of sunk costs, see Appendix A.

11. Paul Joskow, "Does Stranded Cost Recovery Distort Competition," *The Electricity Journal*, April 1996, pp. 31-45. "Sunk costs are composed of capital investments and long-term contractual commitments that have been incurred . . . and whose magnitude is unaffected by future utility behavior." That is, they are costs a utility could not recover in an unregulated market and whose magnitude is unaffected by the amount of electricity it produces from such investments. By netting out revenues from such facilities, the utility is at risk for all costs it can avoid. This preserves the incentive to minimize production costs.

12. Only fixed costs net of any market value, including revenue arising from new value-added services, are potentially strandable.

13. Some argue that transmission plant may be stranded if a customer of the utility is allowed to take power from an alternative supplier over its transmission lines. In this case, the incumbent provider's transmission line is bypassed.

14. Some argue that utility stranded commitments are limited to assets that, by regulatory decision, are and would continue to be used and useful. Thus, a generation asset that is uneconomic (not used and useful) would not be strandable. See, for example, Michael T. Maloney, et. al., "Customer Choice, Consumer Value: An Analysis of Retail Competition In America's Electric Industry," Citizens For A Sound Economy Foundation, Volume I, 1996; John McArthur, "Avoiding the Mistakes of FERC's and California's Full Stranded Costs Recovery," *The Electricity Journal*, March 1998, pp. 57-67; Scott Hempling, et. al., *The Regulatory Treatment of Embedded Costs Exceeding Market Prices: Transition to a Competitive Electric Generation Market*, The National Regulatory Research Institute, November 7, 1994.

15. See, for example, Charles G. Stalon, "The Historical Context of U.S. Electric industry Restructuring: Selections Emphasizing Public Policy Decisions, Parts I and II, *NRRI Quarterly Bulletin*, Vol. 17, Nos. 1 and 2, 1996; Rodney E. Stevenson and David W. Penn, "Discretionary Evolution: Restructuring the Electric Utility Industry, *Land Economics*, Vol. 71, No. 3, August 1995, pp. 354-367.

16. John McArthur, "Avoiding the Mistakes of FERC's and California's Full Stranded-Cost Recovery," *The Electricity Journal*, March 1998, p.58.

17. PacifiCorp claims substantial regulatory assets. We reach no conclusion about this assertion here and would do so only after evidentiary hearing.

18. Great care must be taken to define, measure, and verify stranded commitments. Once stranded commitments are determined to exist, their magnitudes will be sensitive to the underlying assumptions of the analysis.

19. See, for example, Lester W. Baxter, "Different Approaches to Estimating Transition Costs in the Electric-Utility Industry," ORNL/CON-423, Oakridge National Laboratory, October 1995.

20. See, for example, Raymond S. Hartman and Richard D. Tabors, "The Regulatory Contract and Restructuring: A Modest Proposal," *The*

Electricity Journal, December 1996, pp. 71-83.

21. FERC Order 888, pp. 620-621.

22. See Michael T. Maloney, Robert E. McCormick, and Chad A. McGowan, "Stranded Costs Recovery: All FERC'ed Up," *Public Utilities Fortnightly*, November 15, 1996.

23. Lester W. Baxter, "Different Approaches to Estimating Transition Costs in the Electric-Utility Industry," ORNL/CON-423, Oakridge National Laboratory, October 1995, p. 2.

24. Ibid.

25. Baxter adopts an economic interpretation of stranded commitments first proposed by Kenneth Rose. Though he begins with a slightly different definition, at one point Dr. Rose states, "The only potential 'stranded investment' . . . is . . . the fixed generation cost of the utility that is no longer recovered from customers when bypass occurs." See, Kenneth Rose, "An Economic and Legal Perspective on Electric Utility Transition Costs," NRRI 96-15, The National Regulatory Research Institute, July 1996, pp.7-20.

26. If stranded costs are the difference between the utility's embedded cost of generation and market price, stranded cost could be positive or negative as the embedded cost is greater or smaller than the market price. Baxter arbitrarily assumes for illustration purposes that the utility has positive stranded costs. (See Baxter, 1995, p. 6).

27. Michael T. Maloney, et.al. *Customer Choice, Consumer Value: An Analysis of Retail Competition in America's Electric Industry*, Citizens for a Sound Economy Foundation, Vol. 1, p. 46. 1996.

28. Stella E. Rubia and Robert E. Burns, Esq., "Unbundling the Concept of Obligation to Serve in a Competitive Electric Market: Sharing Responsibility for Reliability," *National Regulatory Research Institute, Quarterly Bulletin Vol. 19, No. 2*, page 157.

29. Ibid., page 158.

30. This discussion is drawn from several reports, including: Eric Hirst, Stan Hadley, and Lester Baxter, "Methods to Estimate Stranded Commitments for a Restructuring U.S. Electricity Industry, ORNL/CON-424, January 1996; Eric Hirst, Stan Hadley, and Lester Baxter, "Factors That Affect Electric-utility Stranded Commitments," ORNL/CON-432, July 1996; Lester Baxter, Eric Hirst, and Stan Hadley, "Transition-Cost Issues for a Restructuring U.S. Electricity Industry," ORNL/CON-440, March 1997; and Lester Baxter, "Estimating Transition Costs: Assessing the Options," *The Electricity Journal*, August/September, 1996, pp. 52-64.

31. Higher market value in a deregulated environment may translate into higher prices, making consumers worse off after restructuring. Though it is often assumed that the benefits of competition will outweigh any negative effects of restructuring, inefficient entry into the deregulated electric generation market may raise the overall cost of electricity to consumers. The primary *economic* rationale for exclusive franchise territories is the existence of natural monopoly. As one author demonstrates, "the erosion of economies of scale for power plants is not the same as the loss of natural monopoly." (Steve Corneli, "Will Customer Choice Always Lower Costs," *The Electricity Journal*, October 1996, pp. 21-31). Indeed, recent studies indicate that there are still substantial joint economies in the U.S. electricity market. (See Corneli, note 1, at p. 31.) If these joint economies, or "economies of scope," are large enough, the entry of new firms may increase the overall cost of electricity. (See, R. H. Coase, "The Nature of the Firm," *Economica*, Vol. 4, 1937, pp. 386-405). Therefore, regulators should retain the authority to promote efficient entry, to encourage or authorize downward flexible pricing, and to thwart anti-competitive behavior.

32. A QF (Qualifying Facility) contract arises under the Public Utility Regulatory Policies Act of 1978, and is a contract between the utility and an independently-owned, small cogeneration or power production facility. The intent of the Act was supply diversification in a time of apparent shortage of capacity, to do so using renewable resources, and to promote conservation. If a facility "qualified" (hence the name, qualifying facility) under the Act and accompanying FERC regulations, the utility was obligated to interconnect with it and to purchase its output at rates based on the utility's avoided cost.

33. If a sale is structured correctly, there is no *a priori* reason to believe that the assets being offered will be undervalued. For example, a multi-round, sealed-bid auction can yield maximum value for assets. (See Stephen Maloney, "Auctioning Access to Regulated Markets," *Public Utilities Fortnightly*, March 15, 1996). For a general discussion of market mechanisms and their use, see Jonathan Lesser and Malcolm Ainspan, "Using Markets to Value Stranded Costs, *The Electricity Journal*, October 1996, pp. 66-74; Jonathan Lesser, "Is It How Much or Who Pays? A Response to Rothkopf," *The Electricity Journal*, December 1997, pp. 17-22; and Lisa J. Cameron, Peter Cramton, and Robert Wilson, "Using Auctions to Divest Generation Assets," *The Electricity Journal*, December 1997, pp. 22-31. For an alternative point of view, see Michael H. Rothkopf, "On Misusing Auctions to Value Stranded Assets," *The Electricity Journal*, December 1997, pp. 10-17.

34. See Benjamin A. Holden and Ross Kerber, "PG&E to Acquire 18 Generating Plants From New England Electric System," *Wall Street Journal*, August 6, 1997.

35. Michael T. Maloney, Robert E. McCormick, and Raymond D. Sauer, *Customer Choice, Consumer Value: An Analysis of Retail*

Competition in America's Electric Industry, Citizens for a Sound Economy Foundation, Vol. 1 1996, p. 73.

36. See Lester W. Baxter, "Estimating Transition Costs: Assessing the Options, *The Electricity Journal*, August/September 1996, pp. 52-64.

37. Using a top-down, ex-ante, administrative approach, an estimate of a utility's stranded commitments is calculated as the difference between the utility's average total embedded costs of electricity production and an average assumed market price.

38. See Eric Hirst, Stan Hadley, and Lester Baxter, "Methods to Estimate Stranded Commitments for a Restructuring U.S. Electricity Industry," ORNL/CON-424, Oak Ridge National Laboratory, January 1996.

39. In a recent informal meeting with Utah regulatory agencies, a PacifiCorp officer acknowledged this key point.

40. Eric Hirst, Stan Hadley, and Lester Baxter, "Factors that Affect Electricity-Utility Stranded Commitments," Oakridge National Laboratory, ORNL/CON-432, July 1996.

41. Ken Rose, "Winning Strategies for Stranded Cost Recovery," IBC's 3rd annual industry forum, Washington D.C., June 25, 1997.

42. Jeffrey P. Price, "What's A Power Plant Worth?," *Public Utilities Fortnightly*, September 15, 1997, p.39-40.

43. See, *Inside F.E.R.C.*, July 20, 1998, p. 3.

44. See, *Public Power Weekly*, No. 98-27, July 6, 1998; Kathryn Kranhold, "Some Electric Utilities Expect to Report That Trading Losses Hurt Earnings," *Wall Street Journal*, July 6, 1998; Kathryn Kranhold and Martha Burton, "Soaring Prices for Wholesale Electricity Prompt Calls for Slower Deregulation," *Wall Street Journal*, July 14, 1998; *Energy Insight*, "The Price of Open Markets: Implications From the Midwest," Resource Data International, Thursday, July 2, 1998.

45. *Public Power Weekly*, No. 98-27, July 6, 1998, p. 10.

46. Ibid.

47. Eric Hirst, Stan Hadley, and Lester Baxter, "Factors that Affect Electricity-Utility Stranded Commitments," Oakridge National Laboratory, ORNL/CON-432, July 1996.

48. See Ibid. for a more complete list of factors and their affect on the magnitude of stranded commitments.

49. These assumptions are explicitly required in the bottom-up approach but tend to be implicit in the cost and price forecasts of the top-down approach.

50. Eric Hirst, *Policy Choices for Electric-Utility Stranded Costs*, ELCON, July 1998.

51. The December 1997 issue of *The Electricity Journal* contains a discussion of auctions.

52. In economic theory, many assumptions lie behind this assertion, and it does not include the caveat that market prices may be above regulated prices for low-cost utilities.

53. The following comments borrow liberally from several sources including a report produced by Resource Data International (RDI): *Power Markets in the U.S., A Comprehensive Analysis of Regional Power Markets*, RDI ©1996.

54. These are costs the utility could avoid if it were to curtail its production in favor of less expensive generation services, or in other words, the going-forward fixed and variable or running costs of producing electricity services.

55. Paul Joskow, "Does Stranded Cost Recovery Distort Competition?," *The Electricity Journal*, April 1996, pp. 31-45.

56. Our survey of state and federal regulatory bodies appears in Appendix D.

57. Michael T. Maloney, Robert E. McCormick, and Raymond D. Sauer, "Customer Choice, Consumer Value: An Analysis of Retail Competition in America's Electric Industry," Citizens For A Sound Economy Foundation, Vol. I, p. 73.

58. RDI Report, pp. 34-49.

59. Ibid., p. 36.

60. Ibid., pp. 42-46.

61. Robert J. Michaels, "After Stranding Recovery, What?," *Public Unities Fortnightly*, June 1, 1996, pp. 14-18.

62. Paul Joskow, "Does Stranded Cost Recovery Distort Competition?," *The Electricity Journal*, April 1996, p. 37.

63. Succinctly, economic profits are the difference between a firm's total revenues and its total cost of production, including a return on investment. The concept should become more clear as the discussion progresses.

64. The opportunity cost of a factor of production is defined as the value of the input when used in its next best or highest valued alternative.

65. In theory these costs are treated as if they were continuous. That is, the inputs associated with the costs are treated as if they were infinitely divisible and can be employed in very small quantities. In reality, however, factor inputs may come in discrete lumps, thus, their associated costs can be lumpy.

66. While fixed cost do not vary with the level of output, average fixed costs - the total fixed costs divided by the level of output - decline exponentially with the level of output.

67. William J. Baumol, John C. Panzar, and Robert D. Willig, *Contestable Markets and the Theory of Industry Organization*, Harcourt Brace Jovanovich, Inc., 1982, pp. 280-282.

68. The MIT Dictionary of economic terms defines sunk costs as, "costs which cannot be recovered when a firm leaves an industry." (*The MIT Dictionary of Modern Economic Terms*, David W. Pearce, Editor, The MIT Press, 1989, p. 407) This is similar to the definition used in most undergraduate economic text books. A somewhat more technical definition is given by Baumol et. al.: if C(y,w,s) is the short-run cost function, then K(w,s) are sunk costs for at least s years if

$$C(y,w,s) = K(w,s) + G(y,w,s) \text{ and } G(0,w,s) = 0$$

where y and w are the output or production and the factor input prices respectively. (See, William J. Baumol, John C. Panzar, and Robert D. Willig, *Contestable Markets and the Theory of Industry Organization*, Harcourt Brace Jovanovich, Inc., 1982, p. 280).

69. See for example, Michael L. Katz and Harvey S. Rosen, *Microeconomics*, Irwin, 1991, pp. 215-303.

70. This example is adopted from Michael L. Katz and Harvey S. Rosen, *Microeconomics*, Irwin, 1991, pp. 215-303.

71. The current opportunity cost of an input is its net present value given all expected future economic conditions.

72. See Michael L. Katz and Harvey S. Rosen, *Microeconomics*, Irwin, 1991, pp. 219-220.

73. Tax treatment is shown here to be a simple annual expense. Actual tax accounting is complex and includes deferred treatment which complicates this analysis.

74. The following presentation is adapted from Lester W. Baxter, "Different Approaches to Estimating Transition Costs in the Electric-Utility Industry ," ORNL/CON-423, Oakridge National Laboratory, October 1995 and Eric Hirst, Stan Hadley, and Lester Baxter, "Methods to Estimate Stranded Commitments for a Restructuring U.S. Electricity Industry," ORNL/CON-424, Oak Ridge National Laboratory, January 1996.

75. Typically, electric services are divided into four categories: generation, transmission, distribution, and ancillary services. For simplicity, we are assuming that generation can be unbundled from the other three. So that, the production function of the firm can be separated into two parts: a generation piece and a delivery piece, where the delivery piece includes transmission, distribution, and ancillary services. For our purposes, Q_2 (and Q_1) represent the production function for generation only. That is, they represent the optimal levels of output under regulation and competition, respectively, which is equal to the generation production function evaluated at the optimal levels of inputs under the two scenarios.

76. Total revenue is, by definition, price times the quantity sold for each commodity a firm produces.

77. How this price is set and how the optimal amounts of q and Q_1 are determined are discussed below.

78. Keep in mind that we have written the changes in quantity and price as positive numbers making the revenue shortfall positive. That is, stranded commitments are written as a positive number when both price and quantity for the incumbent fall due to restructuring. On the other hand, if both price and quantity rise, stranded commitments would be negative; the utility would be able to make excess profits under

restructuring. Of course, situations may arise where the price and quantity for the incumbent move in opposite directions. In these cases the sign on stranded commitments would depend on the relative magnitude of the two changes.

79. It is assumed that the asset in question has no alternative use or salvage value.

80. To be consistent with our presentation of the other definitions, we have written Maloney's definition so that SC are positive when the current book value exceeds the current market value.

81. Keep in mind we have simplified the problem to a one period model so, BV = FC_G, where FC_G represents the total investment in generation.

82. Of course Maloney recognizes this point and says so on several occasions. However, Maloney argues, "The term 'stranded costs' has emerged as an issue only in the context of electricity deregulation. It has no roots in economic theory." (See Maloney et. al., 1996). This argument, however, is flawed in at least two ways. First, stranded commitments, though possibly referred to differently, were an issue in both telecommunications and natural gas restructuring. Second, as we have demonstrated, most definitions identify a utility's potential stranded commitments as nothing more than its sunk costs, a concept which is well rooted in economic theory. Maloney is correct, however, in pointing out, 'The decision to allow for the recovery of sunk costs is a normative, political decision. Scientific economic analysis cannot be used to make the call on whether they should or should not be recovered because if they are not recovered, there will be no economic efficiency effect." (See Maloney et. al., p. 73). On the other hand, the way in which they are recovered can have a dramatic impact on the efficiency of the market. Again, as Maloney points out, "basically there is but one efficient way to transfer funds from electric utility consumers to producers, and that is with fixed charges or access fees." (Maloney et. al., p. 70)

83. Michael T. Maloney, Robert E. McCormick, and Chad A. McGowan, "All FERC'ed Up," *Public Utilities Fortnightly*, November 15, 1996, p. 42.

84. FERC Order 888, pp. 620-621.

85. See FERC Order 888, pp. 598-599.

86. Arizona, Proposed Rulings R14-2-1601 through R14-2-1616, October 1996, Title 14, Chapter 2 Article 16.

87. See, among others, Michael T. Maloney, Robert E. McCormick, and Chad A. McGowan, "Stranded Cost Recovery: All FERC'ed Up," *Public Utilities Fortnightly*, November 15, 1996, pp. 42-47; Michael T. Maloney, Robert E. McCormick, and Raymond D. Sauer, *Customer Choice, Consumer Value: An Analysis of Retail Competition in America's Electric Industry*, Volume 1, prepared for Citizens for a Sound Economy Foundation, 1996; and John McArthur, "Avoiding the Mistakes of FERC's and California's Full Stranded-Cost Recovery," *The Electricity Journal*, March 1998, pp. 57-67.

88. Michael T. Maloney, Robert E. McCormick, and Chad A. McGowan, "Stranded Cost Recovery: All FERC'ed Up," *Public Utilities Fortnightly*, November 15, 1996, pp. 42-47;

89. John McArthur, "Avoiding the Mistakes of FERC's and California's Full Stranded-Cost Recovery," *The Electricity Journal*, March 1998, p. 57.

90. The gas industry's stranded commitments were mainly due to take-or-pay contracts estimated to be about $50 billion. These liabilities were shared among producers, pipeline owners, distribution companies, and customers: approximately $3.6 billion will be absorbed by pipeline owners; and while customers eventually paid some of these costs, "the bulk of the debt was negotiated away in settlements between the pipeline companies and the producers over a period of years." See, Margaret Jess, 'Restructuring Energy Industries: Lessons from Natural Gas, Energy Information Administration, Natural Gas Monthly, May 1997. In other industries, such as railroads, airlines and trucking, were deregulation or restructuring has taken place, no (regulatory) recovery of stranded commitments was allowed.

91. *Ibid*, p. 58. While regulators may have added their own distortions to the process that lead to high prices, was not the sole cause of these errors. The regulatory system left both the entrepreneurial function and the ownership of capital in private hands. Because regulators can not match either utility planning resources and know-how, regulators more often than not act as reviewers of utility decisions.

92. While the FERC's and California rules do not technically guarantee full recovery, McArthur argues that the hurtles for recovery are so low as to practically guarantee full recovery.

93. *Ibid*, p. 59.

94. For instance, in 1944 the Federal Power Commission changed the way rate base was measured precipitating utility loses. See, Federal power Commission v. Hope Power Co., 320 U.S. 591, 1944.

95. *Ibid,* p. 61.

96. *Ibid*, p. 63.

97. *Ibid*, p. 64.